

The Social and Economic Impact of Rural Wind Farms

**Supplementary Submission to the Senate Community Affairs
Committee**

By

Parkesbourne/Mummel Landscape Guardians Inc.

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Preface

To the Senate Community Affairs Committee

23 February 2011

I sent the original submission of Parkesbourne/Mummel Landscape Guardians Inc., dated 14 February 2011, to you about a week ago. I said in the preface to it that I would send you a supplementary submission on property value impacts and on the deficiencies of the planning process for wind farms in NSW. This is it.

Before I proceed to the topic of property value impacts and other economic aspects of wind farm development, I must correct a mistake in my previous submission. In my section on amplitude modulation (p. 43) I referred to a graph in Thorne (2010), stating that it shows amplitude modulation of 28 dB at 125 Hz. This is not strictly true, as the graph to which I referred (Thorne (2010), Fig. 2, p. 10) shows fluctuation of sound over 60 seconds, not over 1 second. However, Thorne's next graph (Thorne (2010), Fig. 3, p. 11) shows the pulse pattern second by second. And this graph does appear to show amplitude modulation of about 30 dB. So, my substantive point still seems to be correct.

I apologize for the error, which was due to haste in trying to meet the deadline for submission.

If you wish to check up on this, Thorne (2010) can be downloaded from http://www.windvigilance.com/downloads/symposium2010/swv_symposium_paper_problems_with_noise_numbers.pdf

The full title of Thorne (2010) is

The Problems with 'Noise Numbers' For Wind Farm Noise Assessment. Paper submitted to the First International Symposium on Adverse Health Effects from Wind Turbines, October 29-31, 2010

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Impact on Property Values

The literature on this topic comes to opposite conclusions, according to point of view. Studies sponsored by the wind energy industry or by governments that promote wind farm development find either that wind farms have no impact on property values, or that investigations are inconclusive. Independent research finds that wind farms have an adverse impact on property values. Common sense would say that any property at which residents are highly annoyed by wind turbine noise, and suffer regular sleep disturbance is bound to fall in market value. It is impossible to believe otherwise.

I have not had time to research this topic thoroughly, but I have obtained several documents on both sides of the question, which I will discuss.

NSW Valuer General

The most recent official study, at least in NSW, is the *Preliminary Assessment of the Impact of Wind Farms on Surrounding Land Values in Australia*, prepared by Duponts in association with PRP Valuers and Consultants for the NSW Valuer General (August 2009). The report makes the following assertions in its Executive Summary:

A review of wind farms currently operating in Australia revealed that they have been developed in locations generally removed from densely populated areas. As a result the small samples of sales transactions available for analysis limited the extent to which conclusions could be drawn....

The main finding was that the wind farms [studied – 8 in all] do not appear to have negatively affected property values in most cases. Forty (40) of the 45 sales investigated did not show any reductions in value. Five (5) properties were found to have lower than expected sale prices (based on a statistical analysis). While these small number of price reductions correlate with the construction of a wind farm further work is needed to confirm the extent to which these were due to the wind farm or if other factors may have been involved.

Results also suggest that a property's underlying land use may affect the property's sensitivity to price impacts. No reductions in sale price were evident for rural properties or residential properties located in nearby townships with views of the wind farm.

The results for rural residential properties (commonly known as 'lifestyle prop's) were mixed and inconsistent; there were some possible reductions in sale prices identified in some locations alongside properties whose values appeared not to have been affected. Consequently, no firm conclusions can be drawn on lifestyle properties.

Overall, the inconclusive nature of the results is consistent with other studies that have also considered the potential impact of wind farms on property values.

Further analysis (with additional data and expansion of the study area to other states) [i.e. other than Victoria and NSW] may yield more comprehensive results. Notwithstanding this, further studies are also likely to be limited by the availability of sales transaction data. [Duponts, 2009, p. 2]

The above statements deserve some scrutiny and criticism. On the one hand, the summary asserts quite definitely that the wind farm sites studied “do not appear” to have negatively affected property values in most cases. On the other hand, the “overall” “nature of the results” is declared to be “inconclusive”. How can both these assertions be true? Was there no impact on values, or was the evidence inconclusive? If the evidence was inconclusive, then the conclusion that there was no negative impact ought not to be drawn. The phrase “do not appear” is introduced to gloss over the contradiction.

One cannot help but suspect that the compilers of the report were reluctant to be any more definite than this. For, although they desiderate further research in order to obtain “more comprehensive results”, they then go on to forecast that even with an expanded data base further studies will never reveal the truth! How could this be? I would suggest that the compilers of the report are hiding two things. First, they suggest that future studies will have limited sales data to study, but they do not give the only possible explanation for this fact (assuming it to be a fact), namely, that adversely impacted people, wanting to move away from a wind farm, will be unable to sell their properties. Why else would there be a shortage of data as time passes?

Second, I suggest that the summary hides from view the unsatisfactory methodology of the investigation. I cannot give a full analysis of the report here, but some obvious points can be made.

The report offers a literature review of previous studies, and implies that these studies are all inconclusive. But in fact, when one examines the detailed account of previous studies, one finds that different reports come to diametrically opposite conclusions. For example, the Jorgenson report (1996, Denmark) found that, on average, properties located close to a wind turbine sold for 16,200 DKK (about \$3,700 AUD) less than those located further afield. Also, on average, properties located close to 12 or more wind turbines sold for 94,000 DKK (about \$21,600 AUD) less than those located further afield. By contrast, a report commissioned by the US Renewable Energy Policy Project found that in the case of 6 out of 10 wind farm sites property values went up! What effect there was in the other 4 cases we are not told. (Duponts, 2009, p. 6)

Glaring contradictions of this kind between reports should not be hidden, but should alert us to the influence of interest on studies, and make us question methodologies.

The NSW Valuer General’s Report also fails to draw correct conclusions from the data it assembles. For example, it cites a Western Australian survey according to which most respondents felt that wind farms were acceptable, *provided they were located over 5 kilometres from residences*. The survey also found that a quarter of respondents indicated that they would pay less for a property near a wind farm, and that of these 38% indicated that they would pay 1-9% less, while 22% indicated that they would pay 10-19% less. How could these sentiments not affect market price? And yet the compilers of the report disregard this survey when summing up

their literature review. They blandly conclude, “From the literature review, it is apparent that the perceptions of the negative effect on land values are not borne out by the statistical analysis of sales data, except in very few cases.” This conclusion does not follow from the evidence assembled by the investigation. (Duponts, 2009, p. 9)

Another obvious fault of the report’s methodology is that it examines all sales transactions within *10 kilometres* of a wind farm (Duponts, 2009, p. 14). 10 kilometres is much too far, and in any case a distance should not be selected arbitrarily. If the purpose of the investigation is to test whether the presence of a wind farm is reducing the market value of properties, *or making them unsaleable*, then the investigators should determine an area within which noise and health impacts are likely to be felt, and then discover whether people, badly impacted, and who want to sell, have been able to sell, and at what price – or if they have been unable to sell at all. This is the only method that will enable the truth to be discovered. One cannot help suspecting that investigators commissioned by the wind energy industry or by government do not wish to discover anything that might displease their employers.

The report is at fault in adopting the criterion of properties that have a *view* of turbines (Duponts, 2009, p. 15). It is not the view that is the main cause of annoyance, and it is not the view that is keeping people awake at night. To concentrate on the view, and therefore to include the transaction on properties as far away as 10 kilometres, because the turbines can be seen in the distance, is to avoid the real issue of any inquiry, namely, noise and health impacts.

I will mention only one other fault of the report. One of the wind farm sites studied is that of the Waubra Wind Farm. You will remember that Waubra is the wind farm studied by the noise expert Dr Robert Thorne. I have drawn extensively on Dr Thorne’s investigations for my submissions. The NSW Valuer General’s report examines 6 transactions of properties around the Waubra site. It is remarkable that 5 of these 6 transactions took place *before the wind farm began to operate!* (Duponts, 2009, pp. 36-38) This is not rational. It is significant that in the case of the transaction that occurred *after* the wind farm began to operate, this is the transaction where the investigators find that there was a “possible” reduction in value. They calculate a 27% reduction in value, but refuse to comment further (Duponts, 2009, p. 38).

Why did they not investigate further? Dr Thorne tells us that the Waubra Wind Farm began to operate in its Ballarat section in March 2009, and in its Waubra section in May 2009. He also tells us that within a short time local residents were becoming concerned about noise, and that by August there were reports of adverse health effects (Thorne et al, 2010, p. 110). Why did not the NSW investigators visit the property in question, discover whether there were any adverse noise impacts, whether residents were able to sleep or not, whether the adverse impacts of the wind farm were common knowledge in the Waubra-Ballarat area, and what the opinion of local real estate agents was? They appear not to have done any of this. They blandly remark: “There is generally little sales activity in the area surrounding the Waubra wind farm.” But they do not say why. Could it be because of the wind farm? Why did they not try to find out? (Duponts, 2009, p. 38)

This kind of desktop, statistical analysis of transactions in an arbitrarily determined area will not discover the truth about the impact of a wind farm on property values. The only way for the truth

of this matter to be discovered is by an ‘on-the-ground’ study, where badly impacted properties are visited, where impacted residents are interviewed, and where the experience and opinion of local real estate agents are drawn upon. Without this kind of close examination it will be impossible to conclude anything definite. One cannot help suspecting that the wind energy industry and government want investigations to remain at a distance and inconclusive, so that the policy of wind farm development can proceed unhindered.

In any intellectual study the method adopted predetermines the *kind* of results that can be obtained. If one chooses to examine all sales transactions on properties within 10 kilometres of turbines, on the basis of a view of turbines, this method will guarantee that most transactions, at the outer distances, will show no impact. So, the result will inevitably be that a majority of instances of sales show no impact, and only a minority of instances, within a few kilometres of turbines, do show an impact. The cases where there is a real impact will be swamped by a mass of irrelevant cases that ought not to have been included in the survey. This will enable the inquirers to put forward the contradictory conclusion that wind farms have no impact on sales, and that the evidence is inconclusive. Surveys sponsored by the wind energy industry and by government are bound to adopt this method, as it guarantees the desired result.

Henderson & Horning

The same sort of method was used by Henderson & Horning on behalf of Epuron, the proponent of the Gullen Range Wind Farm proposal. Henderson & Horning surveyed all transactions on properties within 6 kilometres of the Crookwell One wind farm. But Crookwell One consists of only 8 x 0.6 MW turbines, each with a maximum height of only 67 metres. So, 6 kilometres is far too great a distance for the study, both in relation to view and in relation to noise impacts. There is at least one property very close to the wind farm, where the residents are very severely impacted by noise, and which is now unsaleable. The Henderson & Horning study ignores this fact, and duly finds that “we can see no measureable reduction in values for those properties that have a sight line to the development.” Henderson & Horning cannot see this, because they are looking in the wrong place (ngh, 2008, Attachments, vol. 2, 3.7, p. HH 21).

Against these inadequate studies sponsored by industry and government we can set the testimony of real estate agents and property valuers who have had to deal directly with the problem of selling property badly impacted by a wind farm.

The Davis Case

First, I will cite the famous, perhaps notorious, case of the letter sent by Munton & Russell, Estate Agents to Julian and Jane Davis of Spalding, Lincolnshire in England. The Davises own a farmhouse 930 metres from the Deeping St Nicholas wind farm. Shortly after the wind farm began to operate in 2007 the Davises were compelled to abandon their home, as the noise was insupportable (Etherington, 2009, p. 118). Wanting to sell, the Davises contacted a local firm of estate agents, Munton & Russell. Russell Gregory, on behalf of the firm, wrote to the Davises:

Further to your letter dated 26th April 2008 regarding the proposed selling of the above mentioned property. Whilst I understand the difficulty of the situation you are placed in with the problems caused by the wind turbines, until such problems have been resolved I am not able to place a current market value on the property as I do not believe any prospective purchaser would want to inhabit the property, or, indeed in the current climate, whether any mortgage lender would be prepared to lend on the property.

I am therefore sorry to say that I find myself in the rare situation of having to decline any instructions to market the above property, until such problems have been resolved to the satisfaction of any prospective purchaser or their mortgage lender. (Gregory, 2008)

Mr Gregory is telling the Davises that their farmhouse is unsaleable, and worthless, and that it will remain so as long as the wind farm continues to operate. The Davises have lost all financial value in their home.

It is a relatively minor consideration, but worth mentioning, that the noise from the wind farm caused the local council to reduce the rates on the property on the grounds of “noise pollution externally and internal low frequency noise pollution from new wind farm 930m.” (Etherington, 2009, p. 119)

Jane Davis has affirmed in a publicly available statement that she and her husband have been forced to find alternative accommodation 5 miles away in Spalding so as to be able to sleep. She also affirms that before the coming of the wind farm their property would have been worth about 180,000 English pounds, but can now only be sold as land at a price of about 35,000-50,000 English pounds (a reduction of between 81% and 72%). The house itself is unsaleable. (Davis, 2007)

This is a situation faced by all rural property owners in Australia, especially by the owners of what are called “lifestyle properties” or hobby farms. If such properties have to be sold as grazing land, they will suffer a reduction in value of around 70%.

Shane McIntyre

Shane McIntyre is National Sales Manager for Elders Rural Services Australia Ltd. He has been a Licensed Estate Agent for thirty years, specialising in the sale of rural property, all over Australia, but especially in Victoria and the Riverina. He has held senior management positions with the largest rural real estate companies in Australia (McIntyre, 2011). He has made available an e-mail, in which he gives his judgment on the impact of wind farms on rural property values. He writes:

Of significant importance, is the negative effect on the value of adjoining lands where wind towers have been erected. Visually, the towers are seen by the majority of the market as repulsive. Audibly, the towers effect the stillness a property enjoys, in particular the resonating tones in the night, invading the serenity of the adjoining lands.

A proliferation of wind towers adjacent to a property has the same effect as high voltage power lines, rubbish tips, piggeries, hatcheries, and sewerage treatment plants, in that, if buyers are given a choice, they choose not to be near any of these impediments to value.

The ultimate effect is that the number of buyers willing to endure these structures is significantly less than if the structures were not there. This logically has a detrimental effect on the final price of the adjoining lands.

Experts assess the loss of value to be in excess of 30%, and sometimes up to half.

My personal experience is that when an enquiry (potential buyer) becomes aware of the presence of wind towers, or the possibility of wind towers in the immediate district of a property advertised for sale, the “fall out” of buyers is major. Very few go on to inspect the property, and even fewer consider a purchase. On the remote chance they wish to purchase, they seek a significant reduction in the price.

There is absolutely no doubt, that the value of lands adjacent to wind towers falls significantly in value. The ambience of a rural property is important, and oftentimes, the sole reason why a purchaser selects a particular area or district. The imposition of wind towers destroys this ambience forever. (McIntyre, 2011)

Derry Gardner

Derry Gardner is owner and operator of Gardner Appraisal Group Inc. & Gardner Ranch Sales LLC., a real estate appraisal firm, specialising in rural (farm and ranch) properties in Texas (www.gardnerappraisalgroup.com). On February 13, 2009 he made a presentation *Impact of Wind Turbines on Market Value of Texas Rural Land* to the South Texas Plains Agriculture Wind & Wildlife Conference.

Mr Gardner rejects the view of the (US) Renewable Energy Policy Project (REPP), expressed in May 2003, that wind turbines will not diminish property values. (I mentioned this study, with its extraordinary conclusion, on p. 6 above.) He criticises the study made by the REPP on two grounds: (i) it was funded by proponents of wind power, and displayed a built-in bias in its conclusions; (ii) its methodology lacked variables necessary for an adequate analysis. The variables lacking include: rising or falling market; number of days from listing to sale; residential property, not rural property; effect of noise, flickering and shadow; distances; possible change in highest and best use of land because of the presence of wind turbines.

Mr Gardner makes the following assertions:

- A view adds value to rural property.
- Take the view away – the added value goes away.
- Brokers in rural areas confirm that property values in areas of wind facilities are 10% - 30% less than property not in areas of wind facilities.

- Wind energy development creates an income stream, increasing a property's production value; but increased production value does not necessarily result in increased market value. [In other words, if a property hosts turbines, it may still fall in value on the market.]

Mr Gardner sums up the diminution of value from the impact of wind turbines as follows:

- Turbines on property: diminution in value 29-45%, average 37%
- Turbines within 0.2-0.4 miles [320 m – 640 m]: diminution 17-35%, average 26%
- Turbines within 1.8 miles [2880 m]: diminution 15-34%, average 25%

Mr Gardner's figures for diminution in value in Texas are not as high as Shane McIntyre's figures for Australia, or Jane Davis's from the UK, but they are high enough.

Mr Gardner adds that diminution of value may be increased by other factors, including wind turbine infrastructure; high-power transmission lines; substations; additional traffic for service of wind turbine and power lines; additional roads.

Mr Gardner sums up: "Market data and common sense tell us property values are negatively impacted by the presence of wind turbines." (Gardner, 2009)

Michael McCann

Michael McCann is a real estate appraiser and consultant. His company McCann Appraisal LLC is in Chicago [the "Windy City"!]. (McCann, 2011).

On January 25, 2011 Mr McCann sent a letter about the adverse impact of wind turbines on the value of neighbouring properties to OttawaCitizen.com. He writes:

For example, numerous families have been forced to abandon their homes due to the factual impacts to health, sleep disturbance and the like, which the Canadian Wind Energy Association and the American Wind Energy Association prefer to dismiss as "concerns". Many others have been unable to sell their homes due to the presence of nearby turbines, and which a growing list of realtors and estate agents report as being the deciding factor in would-be buyer's decisions to look elsewhere.

There is a measureable and significant loss of values within 2 to 3 miles [3.2 to 4.8 km], and noise impacts have been broadcast as far as 5 miles [8 km] or more, in some instances, with 1 to 2 miles [1.6 to 3.2 km] being commonplace. Value losses have been measured at 20% to 40%, *with a total loss of equity in some instances.* [emphasis in original]

Wind developers have been known to buy out the most vocal neighbours who refuse to roll over and play dead when they are initially ignored, and then turn around and sell

those same homes for 60% to 80% below the appraised value – thus confirming value losses by their own actions.

Other developers have avoided future liability by bulldozing the purchased homes.

In fact, wind developers and the existing Canadian setback are even inadequate to protect neighbours from ice throw or from sections of turbine blades, which are documented as occurring up to half a mile from the turbines, and I have personally heard of a blade throw (piece) that went about 1 mile. . . .

. . . . It is obvious what is happening here: *the wind industry is playing a numbers game, under the assumption or actuarial calculations that it is less costly for them to fight a number of lawsuits from citizens who do not have deep pockets, than it is to buy out the property they need to create huge projects.*(emphasis in original)

The solution is simple, also: Mandate that all property they seek to encompass with industrial overlays be purchased outright, so people have an option as to whether they choose to live in a large, noisy industrial setting. (McCann, 2011)

Mr McCann tells us that he has spent about 2000 hours researching wind energy and its impacts (McCann, 2011). He drew upon this research and his own experience in June 2010 to make a submission to the Adams County Board, Illinois, when that Board was considering the issue of a setback distance for wind farms (McCann, 2010).

Referring to the US Appraisal Institute, he writes:

The **Appraisal Institute** has developed methodology and techniques for evaluating the effects of environmental contamination on the value of real property. The three potential effects that contamination can have on real property: cost effects, use effects, and risk effects. All three effects are recognized as being present with utility-scale wind energy projects, as summarized in my written testimony.

Cost effects can include neighbouring owner costs to attempt to mitigate against sound intrusion, shadow flicker, medical costs to deal with sleep deprivation related conditions, as well as, in some instances, the cost to rent substitute housing and potential legal costs incurred to protect individual owner's property rights, etc. . . .

Use effects include the loss of peaceful use and enjoyment of their homesteads for many turbine neighbours, and there is evidence that livestock has been adversely impacted by the noise from turbines, ranging from death (*goats in Taiwan*) to reproductive disorders (*See Wirtz case in Wisconsin*) and behavioural changes and irritability of horses and cattle. These may also represent cost effects, in some cases, or other forms of financial impact.

Stigma effects can range from loss of aesthetics, diminished views and character of neighbourhoods, to fear of health issues and noise disturbance, etc. This effect is often

manifest in the lack of marketability of homes in the “footprint” and nearby properties most impacted by active turbines, and to varying degrees the known and unknown cost and use effects are also contributing factors to stigma effects. (McCann, 2010, pp. 2-3; bold and emphasis in original)

Mr McCann provides a summary list of his conclusions. I will quote those most relevant to your inquiry.

Residential property values are adversely and measurably impacted by close proximity of industrial-scale wind energy turbine projects to the residential properties, with value losses measured up to 2-miles from the nearest turbine (s), in some instances.

Impacts are most pronounced within “footprint” of such projects, and many ground-zero homes have been completely unmarketable, thus depriving many homeowners of reasonable market-based liquidity or pre-existing home equity.

Noise and sleep disturbance issues are mostly affecting people within 2-miles of the nearest turbines and 1-mile distances are commonplace, with many variables and fluctuating range of results occurring on a household by household basis.

Real estate sale data typically reveals a range of 25% to approximately 40% of value loss, with some instances of total loss as measured by abandonment and demolition of homes, some bought out by wind energy developers and others exhibiting nearly complete loss of marketability.

Serious impact to the “use & enjoyment” of many homes is an on-going occurrence, and many people are on record as confirming they have rented other dwellings, either individual families or as a homeowner group-funded mitigation response for use on nights when noise levels are increased well above ambient background noise and render their existing homes untenable.

Emphasising the need for a 2 mile (3.2 km) setback, Mr McCann states:

If Adams County approves a setback of 1,000 feet, 1,500 feet, or any distance less than 2-miles, these types of property use and property value impacts are likely to occur to the detriment of Adams County residences and citizens for which the nearest turbines are proposed to be located.

He also makes the following statement of principle, relevant to life in what is supposed to be a liberal democracy:

The approval of wind energy projects within close proximity to occupied homes is tantamount to an inverse condemnation, or regulatory taking of private property rights, as the noise and impacts are in some respects a physical invasion, an easement in gross over neighbouring properties, and the direct impacts reduce property values and the rights of nearby neighbours. (McCann, 2010, pp. 5-6)

I will quote only one more of Mr McCann's statements:

As a real estate appraiser with 25 years experience in evaluating zoning matters, I am unaware of any other land use in the 20 States in which I have worked that is permitted to cause such a nuisance that a property owner's rights are completely disregarded and protection of their property values marginalized to the point of meaningless and non-existent protection, via inadequate separation of incompatible uses based on industry-preferred setbacks. (McCann, 2010, p. 13)

This is the situation that is now facing Australia. Wind farm development here has not yet gone very far. There are already victims of noise impacts, adverse health impacts, and adverse impacts on property value, but these are only a small proportion of what the total number of victims will be, when the plans of the wind energy industry, and of state and federal governments are fully implemented. If people are to be protected, then the real impacts of wind turbines must be accurately assessed. At present, in Australia the assessments of the industry and of government are completely inadequate and inaccurate. The Committee must decide to whose evidence it is going to give credence. I suggest that, in relation to impacts on property value, the evidence of studies such as Henderson & Horning's, and the NSW Valuer General's is quite unreliable, because it obscures and mystifies what it ought to be clarifying. I suggest that the evidence of experienced realtors like Shane McIntyre, Derry Gardner and Michael McCann, who have studied these impacts close-up, and "on the ground" is to be preferred.

The NSW Valuer General's report calls for further research (Duponts, 2009, p. 2). It is worthwhile briefly to compare the real need for more medical research into the effects of wind turbine noise and the fake need for further research into impacts on property values. In the case of medical research there is a genuine need for such research. There are important hypotheses concerning the physiological mechanisms that mediate the effect of wind turbine noise on the human body. These need to be investigated, and proved or disproved. There is also a need for epidemiological studies of what proportions of people are affected, in what conditions, and at what distances, and of what sub-classes of people are especially vulnerable – all this to be carried out in real time. All this research is very important indeed. By contrast, the sort of study carried out by Duponts for the NSW Valuer General is a complete waste of time, since the method adopted guarantees that the real effect on the property value of badly impacted residences will be obscured, that the whole subject of property value impacts will be mystified, and that, no matter how much further "research" of this kind is done, the results will always be "inconclusive". All that needs to be done to discover the truth of property value impacts, is for badly impacted properties to be located, and for their loss of value on the market to be determined by consultation with independent real estate agents. This inquiry would not take much in the way of time or resources. It could be done very easily and rapidly. It is significant that governments are not doing this. Instead, they sponsor irrelevant research that claims scientificity merely because it uses statistical analysis. Statistical analysis cannot guarantee a scientific treatment of a topic if it is being applied to irrelevant data. The need for further medical research is genuine. The need for further property value research of the NSW Valuer General's kind is spurious.

It is therefore ironic, if not outrageous, that state governments in Australia are wasting public monies on property values research, and failing to fund the necessary medical research. The state governments of Australia are merely engaged in spin, to provide cover for a wind farm policy that deserves severe criticism.

Finally, it should be remembered that loss of property value or loss of marketability will presumably be suffered at residences where adverse noise impacts and adverse health impacts are also being experienced. The awareness that the family home is being devalued will only add to the stress suffered by the family, thus increasing the risks to health. In this way, the impact of property values cannot be dissociated from the issue of adverse health effects.

Other Economic Issues

The mass construction of wind farms in Australia over the next 10 years, in response to the Federal Government's Renewable Energy Target, will undoubtedly lead to investment, and to the creation of jobs, some temporary and some permanent.

The developers of the Gullen Range Wind Farm project promise that it will inject "in excess of \$200 million into the Australian economy" (ngh, 2008, p. 74). The Gullen Range project was originally for 80 to 84 turbines (since reduced to 73). If we use the figure of 80 to keep the calculations simple, then the investment per turbine is \$2.5 million. I mentioned in my earlier submission that, according to the Clean Energy Council, the wind energy industry plans to construct 4204 turbines in NSW (PMLG, 2011, p. 3). At \$2.5 million per turbine, this would mean a total investment, for the NSW turbines, of \$10,510,000,000. Clearly, an investment of \$10.5 billion for the NSW turbines alone cannot be disregarded.

The developers of the Gullen Range project also estimate the creation of 180 jobs during the construction period, which is predicted to be from 1 to 2 years (ngh, 2008, pp. 74, 43). Let us assume a construction period of 1.5 years. The total number of job-years for the Gullen Range project is

$$180 \times 1.5 = 270 \text{ job-years.}$$

This equates to $270 \div 80 = 3.375$ job-years per turbine.

This in turn means $3.375 \times 4204 = 14,188.5$ job-years for 4204 turbines in NSW.

Assuming the construction of these turbines takes place over the next 10 years, this will mean about 1420 jobs in the construction industry and allied trades for the next 10 years.

I do not know what the total employment in NSW is, but presumably 1420 jobs, even for 10 years, must be a fairly small proportion. Nonetheless, it cannot be disregarded, especially in rural and regional Australia, where local government is continually looking for ways to stimulate investment, and promote economic growth, in what are generally unfavourable circumstances. And, of course, a job is a blessing to anyone who otherwise might not have one, and who might be compelled to leave the area to look for work.

The Gullen Range developers also estimate 15 permanent jobs during the operational life of the wind farm (ngh, p. 74). This more or less corresponds to the statement of Mike Bagot of Suzlon, at the open day organized by NSW DECCW at the Yass Soldiers Club, December 6, 2010. Mr Bagot suggested a figure of 1 technician's job per 6 turbines. This, he claimed, would be a local job.

So, if 4204 turbines are built in NSW, that means $4204 \div 6 = 701$ permanent jobs. This is not very many in comparison to NSW's total workforce, but it will be important for those who get the jobs, and no doubt their employment will help to stimulate employment for others.

In addition, the landowners who host the turbines will receive rent. The precise figures for rent are kept secret by the wind farm companies, but let us assume an average figure of \$8,000 per turbine per year. This means that the total annual rent paid in NSW for 4204 turbines will be \$33,632,000. Some part of that will be spent in the local rural economy, both on consumer goods and agricultural machinery, stock, fencing, etc, even if a good part of it is invested in stocks and bonds, or is used to pay off debts. Some of it will go to the Australian Tax Office.

Against these economic benefits we must place the reduction in value of badly impacted properties, and to some extent of other properties in the local area. I have no way of calculating what the total reduction might be, but if the badly impacted properties lose 30% of their value, on average, or become unmarketable, the total loss of value will presumably be in the 10s of millions of dollars.

Finally, we must consider that rural economies are likely to suffer the loss of the revenue and investment that would come from the migration of “tree-changers” into rural areas. Again, I have no way of calculating this. But if each tree-changer household brings an annual income of \$50,000, it would only need 200 households to bring an increased revenue to local economies of \$10,000,000. It is hard to see how mass tree-changer migration is compatible with the construction of 4204 turbines up and down the Great Dividing Range, and on the South Coast, in NSW.

However, this question of economic costs and benefits is not just a matter of financial calculations, with a view to arriving at a net balance. It is also a matter of social justice. At present, wind farm development in Australia is proceeding in a way that is detrimental to the local communities amongst whom wind farms are located. This is not just a question of reductions of property value, but also of stress, misery, illness, and disruption to family life. Forcing local residents to bear the burden of wind farm development is what economists abstractly call an “externality”. At present, the real costs of wind farms are inaccurately calculated, because the externality borne by local residents does not enter into the calculation.

It is unjust that a minority of Australian citizens should have to bear the burdens of an economic development that is supposed to be in the general interest. In order to abolish this injustice two ways are possible. Either: wind farm companies can buy out the property of all residents badly impacted by their wind farm, either by noise-annoyance or sleep disturbance or other adverse health effects, or loss of property value, or property-marketability. Or: government can pay the cost of new transmission lines and sub-stations that would enable wind farms to be built in areas where they would not disturb anybody. Justice requires that one or other of these ways be implemented. At present, there is collusion between state governments and wind farm developers to reduce costs for the developers. Government relaxes planning controls (see next section) so that developers can locate their wind farms close to existing power lines, regardless of the adverse impacts on the wind farms’ neighbours. In this way government promotes the interest of big property (the developers) by sacrificing the interests of small property (the local residents). Does the political will exist in Australia to change this situation?

The Planning Process for Wind Farms in NSW

As I am only familiar with the planning process for wind farms in NSW, I will restrict myself to comments on the process in this state.

The planning process for wind farms in NSW is a disgrace. It is hopelessly politicised. The officials of the Department of Planning must be under pressure from the elected politicians to relax planning controls and lower standards, so as to enable developers to locate their wind farms close to existing power lines, regardless of the impacts on local residents. This is the only credible explanation for the perfunctory and frivolous manner in which the Department of Planning's assessments are conducted.

That the regulatory regime for wind farm development in NSW is completely inadequate is proved by the fact that the Cullerin and Capital Wind Farms were both approved by the Department of Planning, as complying with Departmental controls, and yet both wind farms are having adverse impacts on some local residents, who are experiencing chronic annoyance and sleep disturbance.

Nonetheless, I will comment on the deficiencies of each stage of the planning process. I will illustrate my points, when necessary, by the case of the Gullen Range Wind Farm. I should inform you that Parkesbourne/Mummel Landscape Guardians (PMLG) has fought a merit case (Class 1) against the project in the NSW Land & Environment Court (NSWLEC 1102, 2010). PMLG also intended to fight a process case (Class 4) against the proposal before it was approved, but was forced to withdraw from the case by the Minister of Planning's premature approval of the project (NSWLEC 41288 of 2008). At the subsequent hearing for costs, the Land & Environment Court found that the Minister "had not acted as a model litigant" (NSWLEC 155, 2009, pp. 25-26).

Planning Legislation and Critical Infrastructure

In NSW the notorious Part 3A of the Environmental Planning and Assessment Act (EPA) removes planning authority for "state significant" projects from the local council to the Minister for Planning (EPA, 1979; EPA, 2005). This removes from the local council the power to protect the interests of its constituents, and tends to reduce the ability of local residents to have an input into the planning process. This ministerial power is capable of being abused, in the interest of developers, and against the interests of local residents.

What is at stake can be illustrated from the Gullen Range Wind Farm project. If the Upper Lachlan Shire Council had remained the planning authority for the proposal, the council's Development Control Plan would have insisted on a 2 kilometre setback (or 15 times the tip height of the turbine used, whichever is greater) (ULSCDCP, 8f). This being so, the proposal for this wind farm would almost certainly never have been made, as there are about 60 non-involved residences within 2 kilometres of the turbines (ngh, 2008, p. 16). The cost of purchasing so many properties (assuming the residents would be willing to sell), or of foregoing turbines would have made the project economically unviable. The economic viability of the project thus depends on

the transfer of planning authority to the Minister, and comes at the expense of the interests of the residents, who are virtually certain to be impacted, if the project is ever built. The transfer of planning authority to the Minister has clearly advantaged the interests of wind farm developers, and disadvantaged the interests of residents.

In 2008 the planning category of *critical infrastructure* was introduced. If a proposal is approved by the Minister as critical infrastructure, then the public loses all right of appeal to the NSW Land & Environment Court (L & EC). There may be no appeals whatever on grounds of merit (Class 1). And appeals on the ground of process (Class 4) may only be made with the consent of the Minister (against the validity of whose decision the appeal is to be made) (NSWPFS 6). This is draconian, deprives the citizens of NSW of a valuable right of self-protection, and abolishes the possibility – desirable in itself – of testing in court proposals that are contentious, or even dangerous.

Until 2009 the threshold for critical infrastructure for wind farms was 250 MW. But in February 2009 Premier Rees announced that the threshold would be lowered to 30 MW (NSWPMR). This change was gazetted in November or December 2009. What this change of threshold means is that virtually every wind farm proposal now counts as critical infrastructure. For, to reach the threshold, a project only needs 10 x 3 MW turbines, or 15 x 2 MW turbines. From now on all projects are likely to be as big as this, and probably much bigger. So, in effect appeal to the L & EC over wind farm projects has been abolished. In view of the known adverse health impacts of wind turbines, this is a reckless and dangerous development, as well as being unjust.

In relation to wind farm development, the NSW government is abusing its privilege of law-making power, which it enjoys through a parliamentary majority. It is using its law-making power to promote the private interests of the wind energy industry, and to give itself “green” credentials, at the expense of NSW citizens in the wind farm “precincts”.

Director-General’s Requirements

When a developer makes an initial application to the Department of Planning, the Department issues the Director-General’s Requirements (DGRs) for the project, stipulating what the developers must perform in their Environmental Assessment (EA), in relation to various kinds of impact – noise, visual impact, impact on water, roads, biodiversity, etc.

With regard to noise, I have already criticised the South Australian Noise Guidelines, in use in NSW, in my earlier submission for PMLG (PMLG, 2011, pp. 48-51). Here I will summarise. The SA Guidelines are inadequate for the following reasons:

The guidelines require only measurements in dB(A), when the A-weighted scale is hopelessly inadequate for measuring low frequency noise and infrasound.

The guidelines fail to distinguish between day-time and night-time noise, and allow wind farms to produce 35 dB(A) at residences, when night-time rural background noise levels may be as low as 20 dB(A) or lower (Thorne et al, 2010, pp. 11-12). If the background

noise is only 15 dB(A), and the turbine noise is 35 dB(A), then the 20 dB difference will mean that the turbine noise will be heard as 4 times as loud as the background noise (Powell, pp. 247-248). This situation guarantees sleep disturbance.

If the mid frequency noise at the residence is at 35 dB(A), then the low frequency noise and infrasound will be at much higher levels, and these will penetrate the walls of the house, and be heard in bedrooms at night. The guidelines fail to deal with this problem of low frequency noise and infrasound.

The guidelines fail to deal adequately with the problem of amplitude modulation. There is peer-reviewed literature affirming that amplitude-modulated sound is more annoying than constant sound. It is the amplitude-modulated sound that causes most conscious annoyance, and which may very well be responsible for the more severe symptoms of Wind Turbine Syndrome.

The guidelines take no account of the inaccuracy of computer-modelling of wind turbine noise. The *actual* noise heard at a residence will depend on the spatial relations of multiple turbines, atmospheric conditions, and terrain, as well as on sound power level and distance.

The guidelines are only interested in average sound levels, whereas actual wind farm noise is subject to fluctuation, which can be as great as 30 dB. The human ear does not average.

The guidelines require compliance monitoring only at the residences where the original, pre-construction noise-logging was done. But Heightened Noise Zones may mean that the worst noise impacts are felt at residences where no noise-logging was done, and which, therefore, do not qualify for compliance monitoring.

In all these ways, the SA Guidelines fail to protect residents of NSW.

With regard to visual impact, the DGRs provide no criteria for determining what constitutes an acceptable and an unacceptable impact. Departmental officials make decisions on visual impact, the grounds for which remain unknown. In modern jargon, the assessment of visual impact has no transparency.

In addition, no method is prescribed for estimating visual impact. The choice of method is left to the developer, and the developer's hired consultant, with the result that absurd and inadequate methods may be used.

The DGRs may require that the impact on land values is assessed, but no method for doing this is prescribed. Once again, the choice of method is left to the developer and the developer's hired consultant, with the result that absurd and inadequate methods are used (see under Henderson & Horning above).

In all these ways the Director-General's Requirements are a sham. At first sight, they appear to give some protection to residents, but on close examination they are found to provide no protection whatever.

The Environmental Assessment

When the developer receives the DGRs, it hires a consultant to carry out the environmental assessment, and to write the report on this, known as the Environmental Assessment (EA). The Environmental Assessment, therefore, is not an independent assessment of the proposal. It is in fact the proposal itself. The consultant does not assess the proposal; it *constructs* it. That the EA is written in support of the developer's purpose may be openly acknowledged at the beginning of the EA, as in the case of the Capital Wind Farm (Connell Wagner PPI, 2006, p. ES – 1). The EA, therefore, is a partisan document. It is written to put the proposal in a good light. It is not impartial.

This means, of course, that the actual assessment of the proposal is to be performed by the Department of Planning. As we shall see, the Department's standards of assessment leave much to be desired.

EAs can vary considerably in quality. When I was concerned with the Gullen Range proposal, I also read the EA for the Capital Wind Farm. In my judgment, the EA for the Capital Wind Farm is an intellectually reputable document. However, the EA for the Gullen Range Wind Farm is, in my judgment, very deficient. I will, therefore, describe some of those deficiencies, to illustrate how inadequate the Environmental Assessment stage of the planning process can be.

The EA is supposed to give a detailed description of the project and its components. The amount of detail must be sufficient for it to be possible for the project to be assessed. In the case of the Gullen Range Wind Farm, no final number of turbines, and no selection of turbine capacity was made. The proposal was for "up to" 84 turbines. The EA said that 24 different types of turbine were under consideration, ranging from 1.5 MW (megawatts) to 3.3 MW. It was implied that the final selection of turbine would be made after the Department had given the proposal its consent (ngh, 2008, pp. 12, 22, 23).

It was thus impossible to know precisely what the magnitude of the project was. Even assuming that all 84 turbines were built, they might be 1.5 MW turbines, or 2 MW turbines, or 2.5 MW turbines, or 3 MW turbines, or 3.3 MW turbines. The total capacity of the wind farm, therefore, might be anywhere between 126 MW and 277.2 MW. It was, therefore, impossible to know what quantity of electricity the project would generate, by what quantity greenhouse gas emissions would be reduced, what quantity of noise would be generated, and so what the risks were of adverse health effects. It was a completely indefinite project. Nonetheless, the Department accepted the proposal as in a fit state to be examined.

It was also impossible to know whether the project would in actuality reach the threshold for critical infrastructure. And yet the developer Epuron claimed the status of critical infrastructure for the proposal. Despite the uncertainty, the Department granted the proposal the status of

critical infrastructure. This meant that, if the Department approved the project, it would be immune to challenge in the Land & Environment Court, even though it was a completely indefinite project!

It was pointed out to the Department, and directly to Minister of Planning Keneally that this situation was absurd. It was like accepting for examination a proposal for a tower block, where the total number of storeys is unknown. This criticism had no effect on the Department or the Minister.

The developer claimed that it was impossible to select a turbine model, as models come onto the market, and disappear from it in the course of time. But there was nothing to stop the developer specifying a turbine *capacity*, and it ought to have done so. The Department ought to have insisted on it. In effect, the Department abandoned a strict planning control for the sake of the commercial convenience of the developer (and whatever company the developer eventually sells the project to). The requirement for a detailed project description in the DGRs turned out to have no force whatever.

As the capacity of the turbines to be used was not specified, the EA needed to provide a worst case scenario for noise impact. But this was bungled. A 3 MW turbine was declared to be the noisiest, and the graphs depicting its sound output showed that it would breach the noise guidelines at about 25 residences around the site. But it was impossible to say with complete certainty which residences, because the graphs were indecipherable (ngh, 2008, Attachments, vol. 2, 3.2, p. 4 and Addendum 1.0). Once again, the inadequacy of this was pointed out to the Department, but once again the Department accepted it.

The visual impact assessment in the EA was a travesty. The DGRs stipulated that a visual impact assessment be done for all existing and approved dwellings within 10 kilometres of the turbines (DGRs, p. 3). Not a single such assessment was done. Instead 3 assessments were said to be representative of all the existing and approved dwellings within 10 kilometres (ngh, 2008, Attachments, vol. 2, 3.1, p. 79). Just how many dwellings there were within 10 kilometres remained unknown, because the developer's agents had not bothered to find out. (There are 230-240 non-involved residences within 5 kilometres (ngh, 2008, pp. 15, 119).)

For the visual impact assessments actually performed the consultant devised an absurd method. It was acknowledged that within 3 kilometres the wind farm would be “highly visible” and would “usually dominate the landscape” (ngh, 2008, Attachments, vol. 2, 3.1, p. 25). Since the EA acknowledged that there are 118 residences within 3 kilometres, it was clear that the visual impact was going to be high for a lot of people (ngh, 2008, p. 110). The developer's problem was to find a way by which that could be denied. The consultant came up with the method. The final estimate of visual impact was said to depend on 3 factors: distance from turbines, “landscape sensitivity”, and viewer numbers. In the case of Pomeroy Road, Mummel (where I live), the factor of distance from turbines [between about 1 and 3 kilometres] gave an estimate of *high*. But landscape sensitivity gave an estimate of *low*, because the consultant arbitrarily declared, in the interests of his client, that all “gently undulating farmland”, and all “hilly farmland” have a low sensitivity (ngh, 2008, Attachments, vol. 2, 3.1, p. 36). And viewer numbers also gave an estimate of *low*, presumably because the volume of human and vehicular traffic on Pomeroy

Road cannot match that of George Street, Sydney. The consultant then added together 1 high and 2 lows, and declared that the final estimate for visual impact was *low* (ngh, 2008, Attachments, vo. 2, 3.1, pp. 49-50). This was absurd, and intellectually disreputable. It was just playing games, in the interest of the developer, to distract attention from the fact that the real visual impact for local residents, if the Gullen Range Wind Farm is ever built, will be massive.

The absurdity was pointed out to the Department of Planning, but the Department accepted it.

The DGRs required the developer to estimate the impact on land values around the Gullen Range site (DGRs, p. 5). However, the developer made no investigations, and declined to estimate the impact on subdivision potential, suggesting that it was impracticable (ngh, 2008, pp. 161-165). Instead of getting independent valuations done on any of the properties likely to be impacted, the developer hired Henderson & Horning to examine all sales transactions within 6 km of the Crookwell One Wind Farm. Henderson & Horning duly found no evidence of impact on sales, despite the existence of one property now unsaleable (ngh, 2008, Attachments, vol. 2, 3.7, p. HH 21). The developer argued by analogy that there would be no impact on values by the Gullen Range Wind Farm (ngh, 2008, p. 164). It was pointed out to the Department that there could be no parallel between a wind farm consisting of 8 x 0.6 MW turbines, with a height of 67 metres, and a wind farm consisting of 84 x 3.0 or 3.3 MW turbines, with a height of 125-132 metres. Inevitably, the Department took no notice.

The noise assessment, the visual impact assessment, and the land value assessment were all deficient. And the visual impact assessment and the land value assessment were not even serious. It was pointed out to the Department of Planning that the EA was not in a fit state to be examined, but the Department went ahead and examined it. The Director-General's Requirements and the Environmental Assessment were, therefore, a complete waste of time, both on the ground that the project was completely indefinite, and on the ground that they gave no protection whatever to local residents. The DGRs and the EA were no more than a formality, giving the appearance that a planning assessment had been carried out. But the assessment was completely inadequate, and neither the developer nor the Department cared.

Public Exhibition of the Environmental Assessment

Once the developer has submitted the EA to the Department of Planning, the Department puts the EA on public exhibition, so that interested members of the public may submit their comments. The usual period for exhibition is 30 days, even though the EPA Act declares that 30 days is only the *minimum* period for exhibition (EPA, 2005, Part 3A, 75 H (3)).

30 days is far too short a period of time to examine an Environmental Assessment that may be 1000 pages long, and that will contain specialist studies based on science and engineering. To expect citizens in employment, or with families to raise to examine such a document, assimilate it, and write a submission on it – all in 30 days, is unreasonable.

This criticism was put to the NSW Parliament's Inquiry into Rural Wind Farms, and it duly recommended that the period of public exhibition be extended to 90 days (NSW Legislative Council, 2009, recommendation 10, p. xxi).

The Department of Planning's choice of 30 days as the maximum, as well as the minimum period for exhibition looks like another attempt by the Department to minimise the input of concerned citizens into the planning process, to privilege the private interests of the wind energy industry, and to marginalize the interests of local residents.

The Major Project Assessment

The Major Project Assessment is the Department of Planning's report of its assessment of the development proposal. It will be accompanied by a recommendation to the Minister that the project be approved, approved with conditions, or not approved. Projects assessed under Part 3A are rarely not approved. No wind farm proposal has ever been rejected by the NSW Department of Planning.

I have already mentioned various deficiencies in the Department's assessment process. So, I will summarise here.

The Department will accept a vague and indefinite project description, even though its own DGRs stipulate a description sufficiently detailed for the project to be assessed.

The Department uses the South Australian Noise Guidelines to assess wind turbine noise, despite the demonstrable inadequacies of those guidelines.

The Department's assessment of visual impact has no transparency. No criteria for visual impact are published. No method for assessing visual impact is stipulated. The Department will accept uncritically the method and results submitted by the developer, no matter how absurd.

The Department will accept uncritically the developer's sponsored research into property value impacts, even if that research is irrelevant, sophisticated, and mystifying. The Department will not insist that relevant cases of badly impacted properties, which have fallen in value or become unmarketable, be located, and their loss of value accurately assessed.

In the case of the Gullen Range Wind Farm, the Department of Planning recommended that the proposal be approved, despite the manifest deficiencies of the EA, stipulating that a "final" noise assessment be done and submitted to the Department before construction proceed (MPA, 2009, p. 39). This was tantamount to declaring that the developer did not have to demonstrate compliance with the noise guidelines *before* approval was given. This undermined the whole assessment process. It amounted to a special privileging of the wind energy industry, telling it in effect that it no longer had to carry out a major part of the environmental assessment before the

Department would approve its proposals. This was a violation of the spirit, at least, of the EPA Act.

The Department's whole assessment of the Gullen Range Wind Farm makes it appear that the Departmental officials must be under pressure from the NSW government to relax planning controls and lower standards, in order to roll through wind farm proposals, for the sake of the private interests of the wind energy industry, and the "green" credentials of the government. The planning process ought to be carried out strictly and impartially in the general interest. But in the case of wind farm development in NSW, the intellectual and moral integrity of the planning process have been compromised, to secure benefits to the wind energy industry and the current government.

After all this, it hardly needs to be said that the NSW Department of Planning has no interest in the kind of research to which I referred you in my earlier submission for PMLG. There is peer-reviewed research connecting wind turbines and adverse health effects. There is peer-reviewed research on wind turbine noise, low frequency noise, infrasound, and the limitations of sound measurement by the A-weighted scale. There is peer-reviewed research linking low frequency noise and infrasound, and adverse health effects. There is peer-reviewed research on amplitude modulation, and its capacity to cause unusually high levels of annoyance. There are real flesh-and-blood people, with names and addresses, who are currently suffering chronic annoyance and sleep disturbance from wind farms in NSW. There are properties known to have become unmarketable. The NSW Department of Planning is, it appears, totally uninterested in any of this.

NSW Land & Environment Court

Under current legislation there is no appeal to the Land & Environment Court (L & EC) in NSW, if a project is approved as critical infrastructure. There can be no merit appeal (Class 1) whatever. A process appeal (Class 4) is possible only with the consent of the Minister (against the validity of whose decision the appeal is to be made).

Since late in 2009 the threshold for critical infrastructure for renewable energy power stations, including wind farms, has been 30 MW. This means that there can in effect be no appeals to the L & EC over wind farm projects, since any project can easily attain the threshold of 30 MW.

Before the 30 MW threshold was gazetted, PMLG was able to bring an appeal against the Gullen Range Wind Farm in the L & EC (NSWLEC 1102, 2010). Therefore, I am in a position to describe what can and cannot be done through the L & EC. It is worth considering this, since if the NSW Coalition is elected to government in the coming election, it will – so it has promised – repeal Part 3A of the EPA Act, which covers critical infrastructure.

The L & EC seems to be limited in what it can do, not only by specific legislation, but also by general legal practice. However, an element of discretionary decision-making also appears to determine how the Court acts.

One disadvantage for residents is that the Court has to accept the South Australian Noise Guidelines, since these are the guidelines chosen by the NSW government, and the government's choice is no doubt authorised by its prerogatives. This means, of course, that any judgments that the Court arrives at, concerning who will be affected by noise, and who will not, are likely to be as inaccurate as those of anyone else who uses the South Australian Noise Guidelines (NSWLEC 1102, 2010, ss. 131-155).

In relation to visual impact, the Court does not publish its criteria for acceptable and unacceptable impacts, just as the Department of Planning does not. Also, the Court does not discuss proper and improper methods of assessing visual impact. It is no more concerned with this than the Department of Planning. The commissioners decide which properties in their opinion are too badly impacted, and which are not. But the grounds of the commissioners' decisions remain unknown (NSWLEC 1102, 2010, ss. 156-167).

The Court recognizes that Australian law provides no compensation for any adverse impact on the land value of any property that is *not* resumed by the development project. For any property that is resumed, the conditions for compensation are laid down in law. But no provision is made to compensate property-owners, whose property is in the vicinity of the project, and whose property falls in value as a result of the construction and operation of the project. The rationale for this is that the land where the project is constructed is zoned. Provided the project is allowed by the zoning, residents must endure whatever projects are approved (NSWLEC 1102, 2010, ss. 5, 107-110).

Our response to this is that the land where wind farms are built is zoned rural, and that what this has always meant is agriculture. Wind farms are industrial power stations that generate industrial noise on a regular basis. They are in no sense agricultural activities. In reality, they radically transform the nature of their rural environment. But the L & EC will not recognize this, and considers only the letter of the law. For there to be recognition of this point, there would have to be a change in the law.

Where the Court thinks that a property will become uninhabitable once the wind farm begins to operate, it will grant to the property owner an acquisition right. That is, if the developer decides to build certain turbines, which would impact too severely upon a certain property, then the developer must offer to purchase the affected property at a price, as if there were no wind farm. This is at least something. However, it leaves the choice to the developer whether to build the turbine or to offer to buy the property. Since the value of the turbine in generating money over 30 years is likely to be more than the value of the property, it may be expected that the developer will choose to offer to buy. This in effect leaves the property owner with no choice, since if the owner refuses to sell, he will find himself inhabiting an uninhabitable dwelling (NSWLEC 1102, 2010, ss. 281, 351, 368, 375, 390, 443, 466, 476-535).

Another disadvantage from the standpoint of appellants is that the Court feels itself obliged to accept government policy on renewable energy, because this policy is enshrined in law (e.g. the Renewable Energy Target). So, the enthusiasm for promoting renewable energy, and *ipso facto* wind farms, of both state and federal governments, is taken for granted by the Court. And the desirability of constructing renewable energy power stations, including wind farms, is considered

by the Court as a factor that can tip the balance, when the Court is weighing up the general interest and the interests of the appellants (NSWLEC 1102, 2010, s. 621). For this reason it may be assumed that it is impossible to get the L & EC ever to reject a wind farm proposal, no matter how detrimental it is likely to be to the local environment, natural and human. The most that the Court will do is to remove a few turbines, and grant acquisition rights to a few property owners.

While the Court takes government policy for granted, it refuses to accept citations of research, even if in peer-reviewed journals, as evidence. The principle on which it stands, I assume, is that evidence must be capable of being examined in court. So, an expert witness's opinions will count as evidence. But if an appellant wishes to cite an article in a medical journal or an engineering journal, that will not count as evidence. A journal-article cannot be examined in the witness box.

This means, of course, that the advantage lies with the wind farm developer, and against the appellant, since the developer is likely to have millions of dollars at its disposal to hire expert witnesses on everything: noise, visual impact, property value, traffic, biodiversity, water, etc, etc. The appellant, if a community association, is likely to have very little money, and probably not enough to cover the charges of hiring solicitor, barrister and expert witnesses. The appellant will, therefore, be unable to cover every relevant aspect of the project, and so be at a serious disadvantage. And there will be no point in the appellant offering its own opinions to the commissioners. The commissioners will refuse to accept them, no matter how well researched and argued, because they are only a layperson's opinion. And a layperson's opinion counts for nothing against an expert's opinion, even if the expert's opinion is manifestly nonsense. PMLG discovered all this to be true when it appealed the Gullen Range project.

It is fundamentally inequitable that the pursuit of justice depends on inequality of wealth between parties. We are supposed to be living in a democracy, not in a plutocracy. But in the NSW L & EC what the Court will consider does depend on the wealth of contending parties, since the developer will inevitably be so much wealthier than the appellant, and will thus be able to field any number of expert witnesses in its favour, while the appellant will only be able to field one or two.

Members of the committee may wish to know the outcome of the Gullen Range case. In her approval of the project the Minister had removed 11 turbines from the project, not to protect any residents, but to protect aircraft using the Crookwell airstrip. The developer appealed this decision to the Court, but the Court upheld it (NSWLEC 1102, 2010, ss. 17-20). The Minister had granted acquisition rights to one landowner in relation to 8 properties adjacent to the wind farm site. The developer appealed. The Court reviewed the matter, and extended acquisition rights from one landowner to 7 landowners, and from 8 properties to 13 properties, and also conditionally to one other landowner and property (NSWLEC 1102, 2010, ss. 227-527, 620).

The Court's decision shows the inadequacy of the Department's original approval. The landowners now in possession of acquisition rights would not have got these without going to the L & EC. But in order to get those rights the members of PMLG had to raise tens of thousands of dollars, from people mostly on very ordinary incomes, who could ill afford the outlay. Ordinary citizens ought not to be put to such expense because of the incompetence of the Department of Planning and the Minister.

From another point of view, the decision of the Land & Environment Court was nothing like as satisfactory as PMLG had wished. It is still the case that there are 118 non-involved residences within 3 kilometres of the turbines of the Gullen Range Wind Farm. It is still the case that most of those residences are downwind of the wind farm in prevailing wind conditions. It is still the case that Thorne and Bakker have shown that in the hilly terrain of Australia and New Zealand wind turbine noise can disturb sleep out to 3 kilometres, and possibly further. So, it is still likely that there will be noise annoyance, adverse health effects, and loss of property value and property marketability on a large scale, if the Gullen Range Wind Farm is ever built. Appealing to the Land & Environment Court can achieve something, but what it can achieve is meagre and insufficient.

Recommendations

I will repeat the recommendations which I made at the end of my earlier submission (PMLG, 2011, p. 58):

Given our still imperfect knowledge, and the ongoing nature of acoustic and medical research:

The rational course of action to pursue is to make a temporary halt to further wind farm development in Australia, until independent, third party research is carried out to investigate thoroughly the adverse health effects of wind turbines, with a view to establishing setback distances adequate to protect residents.

The impacts of existing wind farms in Australia should be re-investigated, in the light of recent research into low frequency noise, infrasound, and their adverse health effects, with a view to providing relief to those currently suffering from the impacts of such wind farms.

Existing wind farms in Australia should be shut down at night to enable their neighbours to sleep.

I will add:

As redress for already impacted neighbours of existing wind farms, either (i) offending turbines should be permanently shut down, or (ii) the wind farm operator must offer to purchase the affected property at a price, as if there were no wind farm, or (iii) financial compensation should be paid to the owner of the affected property by the wind farm operator, at a level satisfactory to the owner of the affected property.

In NSW there is widespread agreement that a Royal Commission is necessary into the NSW Department of Planning. But, this cannot fall under the notice of your committee.

Ideally, there should be a national policy for wind farm development in Australia. But, presumably, this is not going to happen, as the states will not want to give up their planning authority. The wind farm policies of the states need to be thoroughly revised, especially the noise guidelines. Your committee cannot have any effect on that directly. But, whatever findings you make are likely to carry weight in future discussions. I therefore ask you to consider what has been put to you in these submissions for PMLG, and to endorse the recommendations made above.

Concluding Remarks: Economics, Politics and the Law

The reality of wind farm development in Australia is that state governments and the wind energy industry are in collusion, to reduce costs for the industry, by locating wind farms close to existing power lines, and to promote the “green” credentials of governments. To this end the intellectual and moral integrity of state planning processes have been compromised. Planning officials have relaxed controls, and lowered standards in order to roll wind farms through. Some environmental consultants (not all) have produced Environmental Assessments that are perfunctory and frivolous, and which cannot be taken seriously. As a result, wind farms have been approved and constructed, which are now inflicting suffering on neighbours who live in their vicinity. Others, approved but not yet constructed, threaten to inflict such suffering on more residents. And, generally, the plans of the wind energy industry and government to build thousands of wind turbines throughout Australia, to help meet the Renewable Energy Target, guarantee that *in toto* thousands of residents will be so affected.

Peer-reviewed research demonstrates the connection between wind turbines and adverse health effects. The authoritative testimony of experienced and qualified realtors declares that wind farm affected property will lose value, and may even become unmarketable. These facts may be considered indisputable. It is only the wind energy industry and its supporters in government who, in their own interest, offer to deny these facts, producing spurious reports to mystify and delude.

It should be apparent that the law, politics and the power of money are on the side of the developers and pro-wind politicians. Acoustics, noise engineering and medical research support the claims of adversely affected residents. But, science by itself is not powerful enough to overcome the power of vested interests.

Let us be clear about what is at stake. On one side the wind energy industry is likely to see its costs escalate, if adequate setbacks are established to protect residents. A setback distance of 3.5 kilometres will mean an end to locating wind farms close to existing power lines. New transmission lines and new substations will cost millions of dollars. Either the industry’s profits will be reduced, or Australian taxpayers will have to pay. Someone will have to pay. On the other side, thousands of innocent citizens stand to lose their quality of life, their peace of mind, their health and the value of their property. There can be no compromise. Someone will lose. This *is* a zero-sum game.

The only just solution is that, if wind farms are considered by Australian society to be in the general interest, then Australian society as a whole must be prepared to pay the costs of such development, so as to give adequate protection to residents who might otherwise be adversely impacted.

Australian Parliaments can act to establish a policy for wind farm development, that is just and humane. Or they can dismiss the issue as too difficult, as too likely to offend the rich and powerful, as too likely to lose votes.

But the matter will not end there. Within the next five or ten years the necessary medical and epidemiological research into the impacts of wind turbine noise upon health will be completed. When it is, then affected residents will sue. They will sue the wind farm operators, the planning authorities, and the landowners who host turbines. They will not be put off by legal costs, because they will enter into contracts with legal firms that offer no-win, no-cost deals. This will happen. Can anybody seriously imagine that the victims of chronic annoyance and chronic sleep disturbance will not act to obtain redress, when an opportunity is offered? It is only a matter of time. Australian parliaments must decide now whether they will act, so that future conflict may be avoided.

Appendix

A Note on Amplitude Modulation

I discussed amplitude modulation in my earlier submission (PMLG, 2011, pp. 42-45). I am adding this note, because it is likely that during your sessions some representative of the wind energy industry or of government will tell you that according to a British government report amplitude modulation is not a significant problem of British wind farms. There are no grounds for the British government's assertion.

The story is as follows. In 2007 researchers from the University of Salford were commissioned to investigate the problem of amplitude modulation. A survey of local authorities with wind farms in, or adjacent to their area was carried out. The report concluded that amplitude modulation was only a minor problem, and did not justify further research (Moorhouse et al, 2007).

The Department of Trade and Industry, which had commissioned the report, had been advised to do so by the Noise Working Group. Dick Bowdler, an acoustician, and member of the Noise Working Group, resigned from it, on account of the inadequacy of the Salford report. In his letter of resignation he protested that the Salford survey had not carried out the original intentions of the Noise Working Group, whose idea the survey had been. According to Bowdler, the Noise Working Group had never been in any doubt that further research into amplitude modulation was necessary, and it suggested the survey as a preliminary study to identify up to 10 sites where amplitude modulation might be studied further.

One shortcoming of the survey was already apparent: it had been a survey of the opinion of local councils, not of residents living near wind farms.

The DTI and the Salford researchers refused to publish the questionnaire response forms. However, these became available after a Freedom of Information request. It then became apparent that the questionnaire had been badly designed, and the questions badly phrased. Moreover, it was clear that some of the officials who had completed the forms did not understand just what amplitude modulation is (Hanning, 2010, 3.6, pp. 27-29; Bowdler, 2008)

The assertion that amplitude modulation was only a minor problem at British wind farms was, therefore, without foundation.

This is yet another instance of "research" into wind farms, carried out on behalf of government, being perfunctory and frivolous.

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